

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

*Ex parte* BUAN HENG LEE, TECK HONG LOW, HAI RONG WANG,  
TANG YING, and ZADIG CHERNG-CHING LAM

MAILED

SEP 09 2004

U.S. PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

Appeal No. 2002-2088  
Application No. 09/186,388

ON BRIEF

Before RUGGIERO, GROSS, and LEVY, *Administrative Patent Judges*.  
GROSS, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is a decision on appeal from the examiner's final rejection of claims 1 through 28, which are all of the claims pending in this application.

Appellants' invention relates to a method of forming source and drain regions and of doping a polysilicon electrode including implanting P<sub>2</sub><sup>+</sup> or As<sub>2</sub><sup>+</sup> ions using a single ion implantation step. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. A method of forming source/drain regions, comprising the steps of:

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providing a semiconductor integrated circuit wafer having source/drain regions;

providing an ion implant apparatus;

placing a phosphorous ion source in said ion implant apparatus;

adjusting said ion implant apparatus so that said ion implant apparatus produces an ion beam comprising  $P_2^+$  ions, wherein said ion beam has a beam density and a beam energy;

implanting impurities into said source/drain regions of said integrated circuit wafer, wherein said impurities consist of  $P_2^+$  ions implanted using a single ion implantation step and said ion beam; and

annealing said integrated circuit wafer having  $P_2^+$  ions implanted at an anneal temperature for an anneal time.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Aitken	4,578,589	Mar. 25, 1986
Current	5,155,369	Oct. 13, 1992

Claims 1 through 28 stand rejected under 35 U.S.C. § 103 as being unpatentable over Current in view of Aitken.

Reference is made to the Examiner's Answer (Paper No. 20, mailed April 22, 2002) for the examiner's complete reasoning in support of the rejection, and to appellants' Brief (Paper No. 19, filed March 5, 2002) for appellants' arguments thereagainst.

**OPINION**

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellants and the examiner. As a consequence of our review, we will reverse the obviousness rejection of claims 1 through 28.

For claims 1 through 14, appellants argue (Brief, pages 13-14) that Current describes a two step ion implantation method whereas the claims recite single step ion implantation methods. For claims 15 through 28, appellants (Brief, pages 15-16) set forth substantially the same argument. The examiner states (Answer, page 5) that

in Col. 8, at the top, Current teaches a single implantation step of  $P_2^+$  or  $As_2^+$ , followed by an implantation of another species, the claims comprise an ion implantation of one species the  $P_2^+$  or  $As_2^+$ , but the scope of the claim does not preclude the implantation of a second species, therefore it would have been within the scope of one of ordinary skill in the art to implant the  $P_2^+$  or  $As_2^+$  in one single step followed by an implantation of another species.

Thus, the examiner admits that Current discloses a two step ion implantation method, but asserts that the claims do not preclude a second ion implantation of a different impurity. We disagree with the examiner.

Although claim 1 includes the word "comprising," and therefore does not preclude additional steps, any additional

steps cannot be inconsistent with the steps that are recited. Claim 1 recites implanting impurities wherein "said impurities **consist of**  $P_2^+$  ions" (emphasis ours). Thus, only  $P_2^+$  ions may be implanted. Claim 1 continues that the ions are implanted "using a single ion implantation step." Thus, claim 1 requires a single ion implantation step for implanting only  $P_2^+$  ions. Claim 1 is clearly limited to a single implantation step. Independent claim 15 includes the same language. Independent claims 8 and 22 each recite that "said impurities **consist of**  $As_2^+$  ions" and that the ions are implanted "using a single ion implantation step." Thus, claims 8 and 22 require a single ion implantation step for implanting only  $As_2^+$  ions. Current clearly fails to meet the limitation of a single ion implantation of either  $P_2^+$  or  $As_2^+$ .

The examiner combined Aitken with Current for a teaching to use a solid ion source.<sup>1</sup> Aitken provides no suggestion or teaching to modify Current to have a single ion implantation step. Thus, Aitken fails to remedy the deficiency of Current. Consequently, we cannot sustain the obviousness rejection of claims 1 through 28.

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<sup>1</sup> We note that the limitations for which Aitken was applied appear only in dependent claims 7, 14, 21, and 28.

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## CONCLUSION

The decision of the examiner rejecting claims 1 through 28 under 35 U.S.C. § 103 is reversed.

**REVERSED**

JOSEPH F. RUGGIERO )  
Administrative Patent Judge )

*Anita Peltman Gross*  
ANITA PELLMAN GROSS  
Administrative Patent Judge

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